



Editorial

Energy market financialization, integration and systemic risks

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1. Introduction

Confronted with increasing challenges of global climate change, international energy market has experienced substantial changes over the last decades. Financialization in commodity market, specifically in the energy sector, has become a popular topic in the recent literature. One of the main features of energy financialization is that the movements of energy prices have demonstrated similar patterns to that of the typical financial assets. For example, energy prices have experienced excess volatility, speculative bubbles, and price co-movements. The consequence of such changes is that traditional forecasting of energy price based on fundamentals tends to fail. In addition, rising systemic risks due to co-movements across energy types and geographically segmented markets give clear challenges to standard risk management models. As a result, global energy markets have shown to be increasingly more integrated, especially at regional level. Exploring this trend, together with the increasing concerns about systemic risks in energy markets, is thus an important research question.

Since 2018, the external environment of the international energy market has experienced significant changes, and as a consequence, a wide range of economic, political and climate-related issues have imposed strong impacts on the market movements, making the system more complex. For example, the US-China trade war, global climate actions, Ukraine–Russia war, and the COVID-19 pandemics overlap with each other and are fundamentally changing the global energy system. The negative oil price events in 2020 were unprecedented, and the European energy crisis caused by the soaring oil and gas prices does not seem to have an easy solution. All these indicate that the global energy market has entered the VUCA Era, namely, volatility, uncertainty, complexity and ambiguity, which will pose new challenges to academic research and industry practice.

To understand the cause and fundamental mechanisms of such changes in the international energy market, it is important for economists, in particular energy economists, to expand their regular territory

and adopt new theoretical and empirical methods, e.g. those from financial economics. There are needs, first of all, to establish a comprehensive set of empirical evidence and draw an accurate picture of the new challenges, then to develop theoretical models that can incorporate the special characteristics in energy markets, and, in addition, to provide practically feasible solutions to deal with the challenges.

In order to enrich the research progress in the field of energy finance and bring new insights in this area, the China Energy Finance Network hosted its fourth annual International Conference on Climate and Energy Finance (ICEF) in 2021. 182 papers were accepted for oral presentation in 42 concurrent sessions, which deal with energy and financial markets, carbon finance, volatility modelling and forecasting, technology and green transition, environment and corporate finance, energy risk management and big data analytics. After successfully edited the first special issue of *Energy Economics* from this series of the ICEF conferences (Zhang and Ji, 2019), we present the second collection of papers from the fourth ICEF conference under the general title “Energy Market Financialization, Integration and Systemic Risks”. Of 48 initial submissions for consideration of inclusion in this special issue, 9 of them have made to the final stage. The summary of these papers is given in the following section.

2. Main contents of this special issue

The first paper in this special issue is in the theme of big data analysis, which uses text mining technique from Twitter to study energy markets. Big data driven behavioral research has recently been considered as an effective way to analyze investor behavior and study energy market rules (e.g., Ji and Guo, 2015; Reboredo and Ugolini, 2018; Loureiro and Alló, 2021). In this paper, Austmann and Vigne (2021) investigate the impact of environmental awareness on the electric vehicle market from the psychological perspective. The key innovation is to use Twitter keywords as an environmental awareness barometer, which overcomes the problems and limitations from traditional survey

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approaches, for example, social desirability bias of respondents, sample size and distributional issues, and dynamic changes of respondents' emotions. This research also provides general evidence from 27 member states of the European Union and two European Free Trade Association states. Their results show that environmental awareness cannot significantly influence the electric vehicle market while other factors might have played a more important role under the current policy regime and market condition.

The second group of papers in this special issue pay attention to the topic of market integration and volatility spillovers. These papers provide further evidence on energy financialization, that is, the energy market has become more volatile and risky. They provide further evidence on the information linkages between energy markets (see [Ji et al., 2019](#) and [Ji et al., 2020](#) for some earlier studies). In this group, [Ma et al. \(2022\)](#) propose a two-step research framework to test the volatility spillovers in European electricity markets and then identify the role of economic policy uncertainty in affecting the overall and market-specific volatility spillovers among electricity markets. They use a time-frequency volatility connectedness approach to effectively differentiate the heterogeneity of volatility spillovers at the different time horizons. Their results show clear evidence that the European electricity markets are highly integrated in which its overall volatility is heavily driven by uncertainties in European economic policy.

[Okorie and Lin \(2022\)](#) build both the return and volatility spillover systems among the top six Nigerian oil and gas industry stocks together with crude oil prices. Their empirical results provide detailed information on the investment choices among these oil companies, who potentially act as the safe-haven for the Nigerian oil & gas market. Their results also reconfirm the asymmetric effect between good news and bad news, whereas the good news contributes more to the system risk relative to the bad news.

[Chen et al. \(2022\)](#) focus on spillovers from energy to financial assets from extreme risk perspective based on Conditional Value-at-Risk (CoVaR) values. They employ time-varying copula models to estimate both upside and downside CoVaRs considering risk spillover effects of OVX changes and USD/RMB exchange rate fluctuations to that of Chinese stock market. Their results show that both oil market uncertainty and USD/CNY exchange rate changes have significant risk spillover effects to Chinese stock market, while uncertainties in oil market present stronger impact than exchange rate uncertainties.

[Su et al. \(2022\)](#) comprehensively investigate the return, volatility and risk spillovers between green bonds and conventional financial markets in China. They employ time-frequency BK spillover index and MVMQ-CAViAR model and find equity assets produce huge extreme risk spillovers to Chinese green bonds. Especially, the spillover effects between Chinese green bonds and fixed income assets in the return and volatility spillover modes are strong.

The third stream of papers in this special issue investigate the systemic risk among the energy and commodity markets and present some new risk characteristics during the COVID-19 period. It is well known that the pandemic of COVID-19 has greatly disturbed the global financial system and raised the level of global risk spillovers ([Zhang and Ji, 2020](#)). Energy markets also share the same shocks. [Farid et al. \(2022\)](#) provide new evidence for the quantile connectedness between energy, metals, and agriculture commodities during the COVID-19 period. They chose a large group of 34 commodities to identify their tail dependency structure in the return system. The results show strong connections within the commodity classes especially in the energy commodity group, and thus confirm the role of COVID-19 in increasing the transmission among commodities.

[Xiong and Chen \(2022\)](#) propose a novel method to model the systemic risk in international energy markets by considering two characteristics of systematic risk measurement including central diffuseness and noise insensitivity. Their sample covers 21 energy futures markets, which are divided into nine energy types, and then a series of risk spillover networks are built. They prove once again the importance of

the oil market in the whole energy system, in which it contributes more systemic risk than other energy types.

Next topic focuses on energy price volatility forecasting modelling, which is important for investors' decision for hedging strategies and risk aversion ([Ma et al., 2019](#)). In this topic, [Niu et al. \(2022\)](#) extend the HAR-RV models to forecast the realized volatility of crude oil futures price by introducing seven uncertainty measures. They find that uncertainty can indeed improve the prediction of crude oil volatility where uncertainty in crude oil market (OVX) has the greatest impact on crude oil volatility. In the meantime, they verify that implied volatility index (VIX) and Financial Stress Index (FSI) play significant roles in volatility forecasting before COVID-19, while the predictive ability of Equity Market Volatility (EMV) increases during the COVID-19 period.

The last topic in this special issue discusses the issue in corporate finance and environmental responsibility, which has become popular in recent years due to the global climate challenge. In this group, [Meng and Zhang \(2022\)](#) investigate the relationship between corporate environmental information disclosure and related investor responses. They have collected environmental information disclosure data of all Chinese listed companies from 2004 to 2020 and controlled the impacts of annual reports on investor response. They find a significant negative response of investors to environmental information disclosure, especially for those heavy-polluting companies and companies with high institutional shareholding.

3. Further perspectives

In the future, as countries are taking more radical actions to mitigate climate change, the global energy system will undergo a steady transition process towards renewable energy. It means that international energy market will experience further and fundamental changes, where a greener energy market will be needed. However, we have to realize that the energy transition process is more costly and risky. It will be accompanied by the sharp rise and fall of traditional fossil energy prices. Investment and financing decisions in the energy market will become more challenging under greater uncertainties in the energy transition process, which also makes the field of energy finance more relevant. While the puzzles and stylized facts found in the literature require theoretical explanations, new insights and methods are also needed to provide effective support for governments, companies, and also financial practitioners to respond to these challenges.

The China Energy Finance Network will continue to support international dialogues between Chinese scholars and the international society, meanwhile, our annual conference will carry on attracting knowledge sharing and encouraging cutting-edge research in the field of climate and energy finance.

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